



# ***Texas Public Safety Broadband Program***

## **Texas FirstNet Event Overview**

April 16, 2013

Mike Barney

PS LTE Program Manager  
Chief Engineer

# ***Agenda***

- Texas' Road to PS LTE
- Status of Texas Public Safety Broadband
- Presentation to FirstNet Board (1/17/2013)
- Technical Overview of System



# ***Texas' Road to PS LTE***



*Harris County Hurricane Evacuation*





*Texas Wildland Fires*



*Amarillo Ice Storms*

## Potential Hazards

- Hurricane
- Tornado
- Flood/Flash Flood
- Winter Storm
- Power Outage
- Water Outage
- Wildfire
- Mass Fatality
- HazMat or Chemical
- Terrorist Act
- Civil Disturbance
- Earthquake
- Oil Spill
- Economic Loss
- Communications
- Urban Fire
- Building Collapse
- Subsidence
- Utility Outages
- Drought
- Disease
- Rail Accident

TEXAS DEPARTMENT OF PUBLIC SAFETY  
DIVISION OF EMERGENCY MANAGEMENT



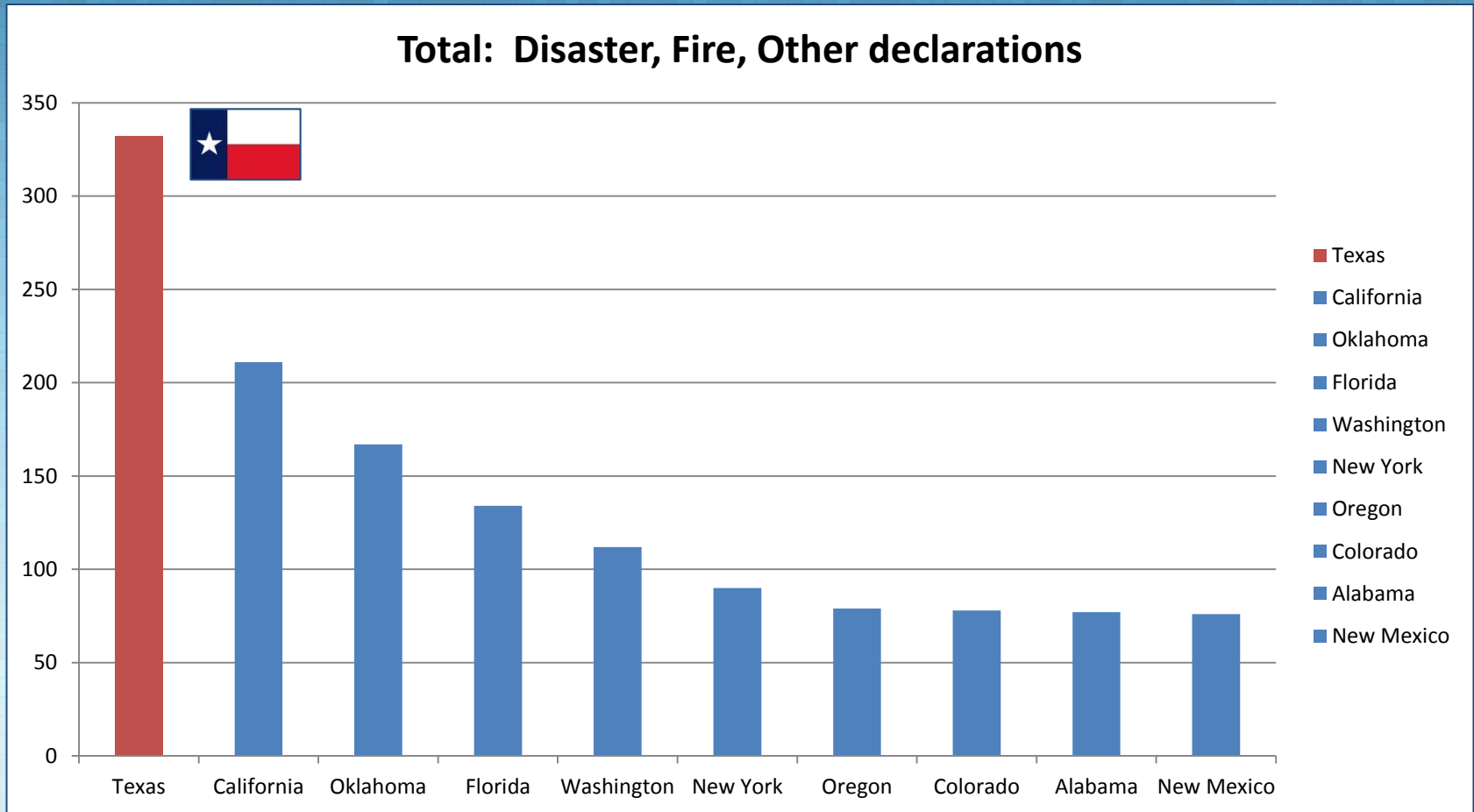
*Comal County Floods*



*DFW Tornadoes*



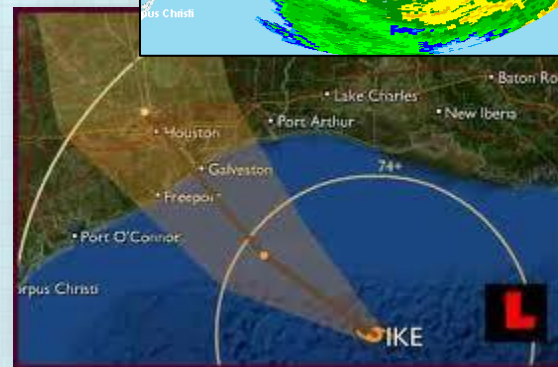
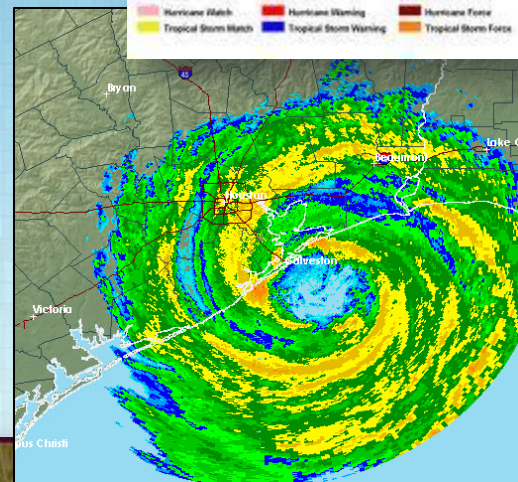
# ***Texas: Leading the Nation in Disasters***



Texas has faced far more catastrophic incidents than even the second place state, California.

# Hurricane Ike

- **Hurricane Eye Landfall:**  
September 13, 2008 at 2:10 am
- **Tropical Hurricane Force Winds:**  
Late afternoon of September 12
- **Maximum winds:** 145 mph
- 195 people died as a result of Ike (103 direct; 92 indirect)
- 23 people are still missing

















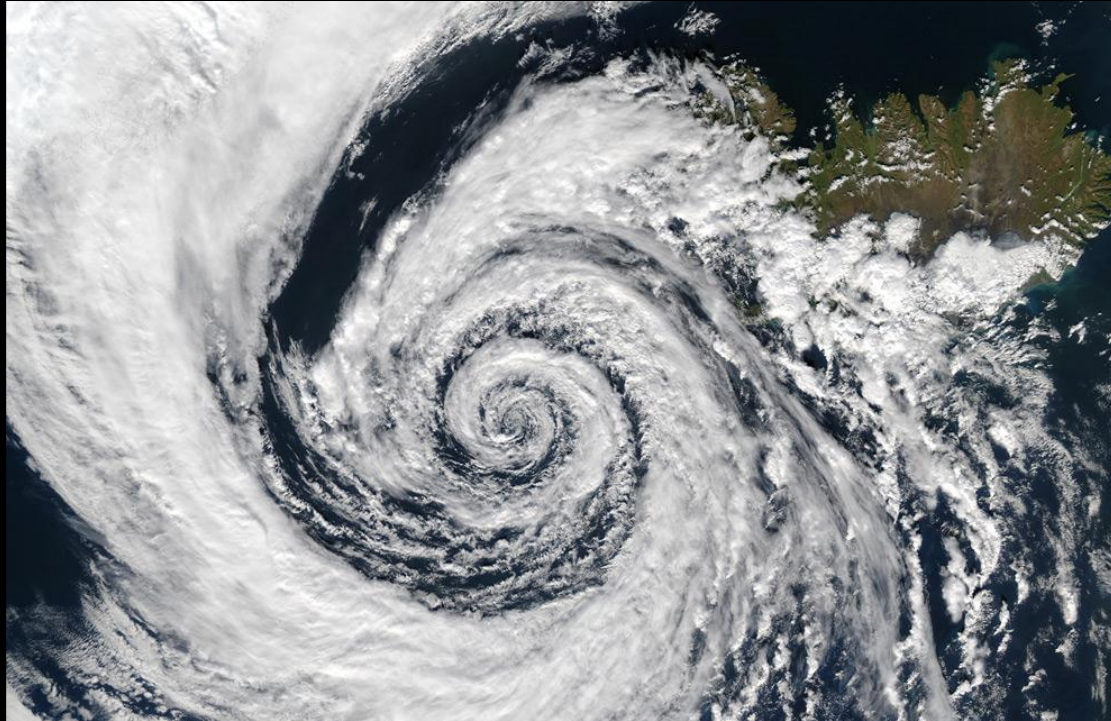
# *Evacuee Tracking*



*2005 Houston Astrodome Sheltering  
Post-Hurricane Katrina & Pre-Hurricane Rita*



# Hurricane Ike Evacuation

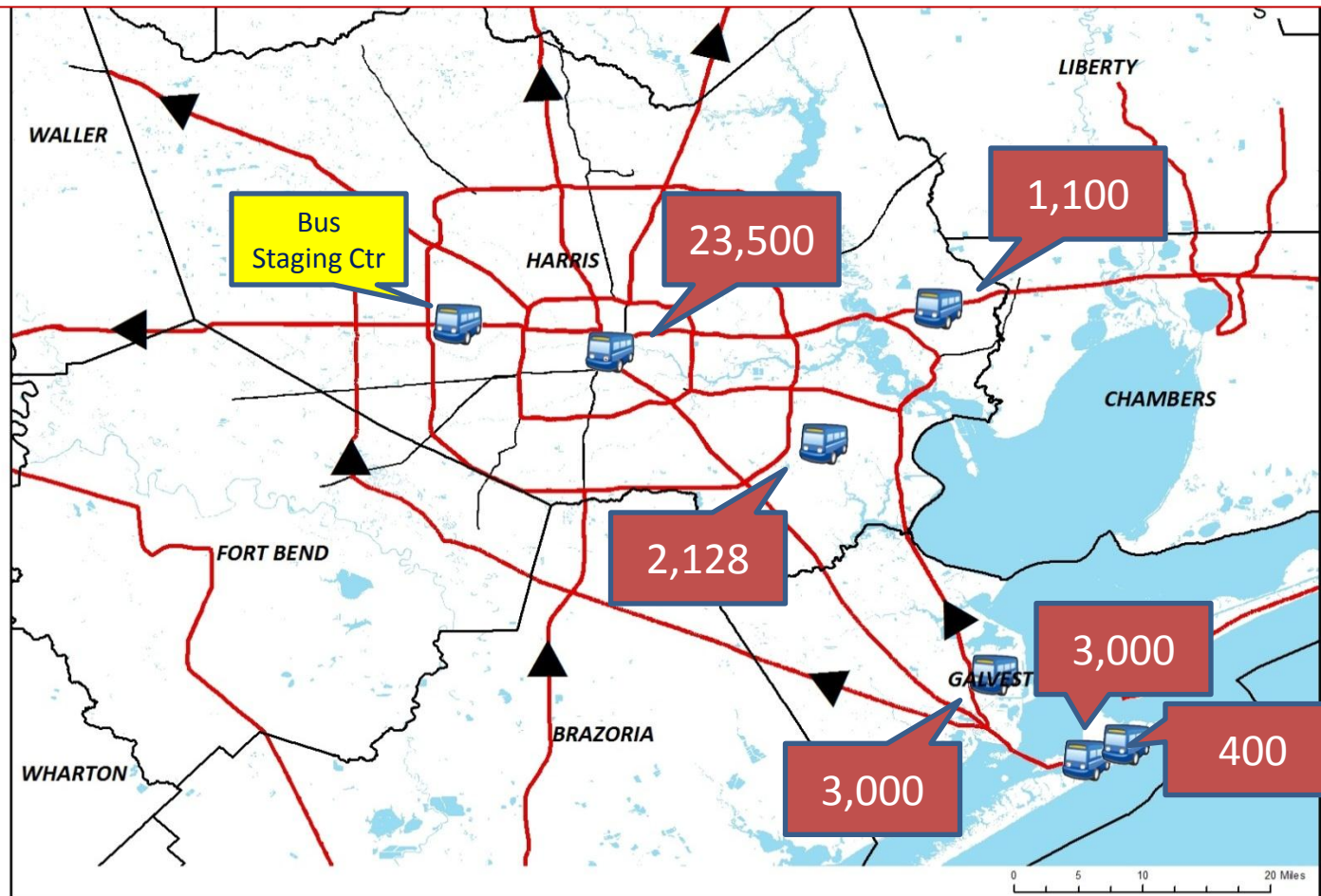


Tropical force winds began before  
5 pm on September 12

# Additional Sites Needed for....

## Evacuation Transportation Hubs

- Hubs are loading points for tens of thousands of evacuees
- Typically in convention center or mall parking lots
- Extremely susceptible to cellular overload

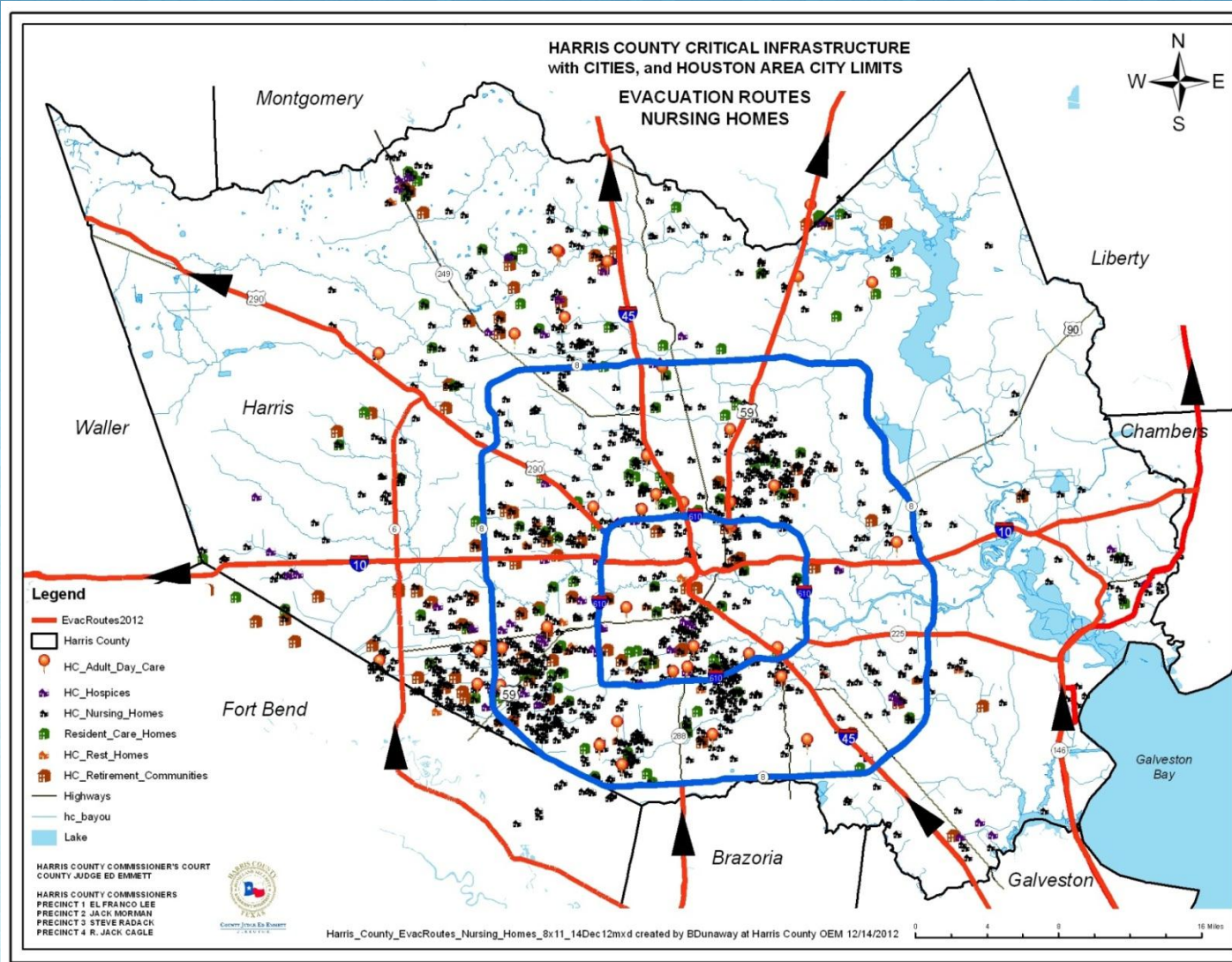




# Additional Sites Needed for....

## Nursing Homes

Every nursing home must be individually checked in person by local emergency management staff & help is often required from jurisdiction to evacuate patients



# ***Current Status of TxPSBP***

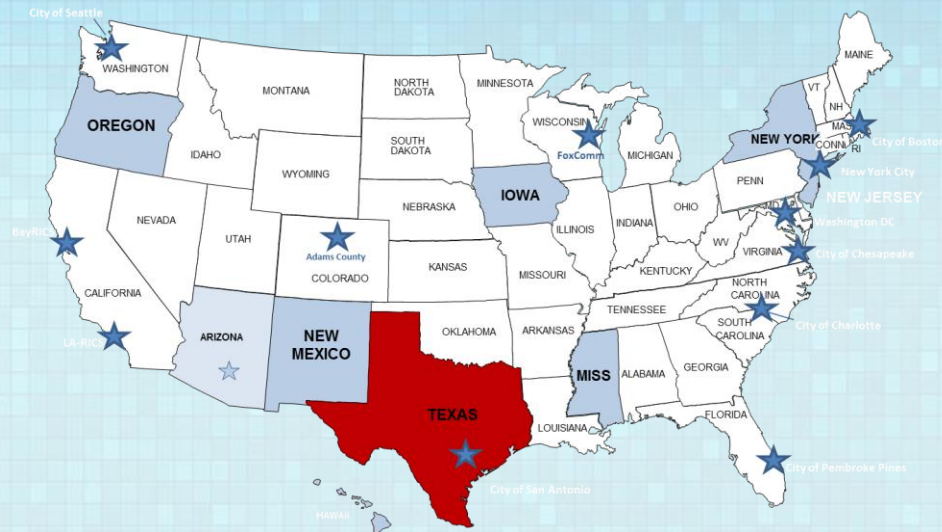


*MacDonald Observatory*



# Texas PS LTE Background

- Harris County began planning for PS LTE in 2009
- Funded system efforts through Port Security grant program and local contributions
- In May 2011, Texas received a statewide waiver from the FCC in the *Texas Waiver Order* (11-863)
- In partnership with Harris County ITC, the State aggressively pursued authorization to operate
  - Since the Texas Waiver, DPS has filed over 1800 pages and over 70 filings with FCC



★ Represents original waiver entities

# ***Recent Developments***

- FCC approved Texas Interoperability Showing, v9, on July 31, 2012 allowing operation for 31 days
- In August, Texas applied for 6 month Special Temporary Authority (STA)
- FCC granted Texas STA for 14 sites for Harris County on August 31, 2012 (12-1432)
- Allowed use of all 20 MHz of spectrum
- FirstNet presentation 1/17/2013



*Super Bowl Ice Storm  
Dallas 2011*



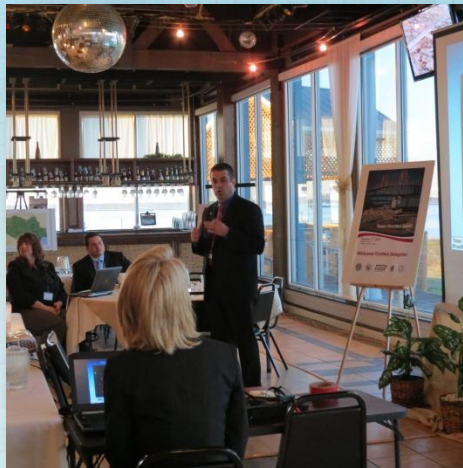
# ***Presentation to FirstNet Board***

## ***January 17, 2013***



# ***Harris County - Baytown***

- Presentation:
  - Why we need public safety broadband network in Texas?
  - Technical details of network
  - Financial model for deployment and maintenance of network





# ***Harris County - Baytown***

- Demonstration:
  - Baytown PD: Discussion with officers using devices everyday
  - Patrol boats: Visit to sites along port, viewing video from other users
  - Command Vehicles: Viewing all participants
  - Helicopter downlinks: Video from helicopter linked to Lex devices, etc.





# *College Station – Disaster City*





# *College Station – Disaster City*

- LTE equipment located at Texas A&M, Kyle Field





# ***Scenario #1 – Collapsed Building***



- Collapsed building with victims trapped in the rubble
- Disciplines involved:  
Search & Rescue, EMS, and Hospital





# ***Collapsed Building***

If a picture is worth a thousand words, then what are 3 pictures worth?

- In-car video of scene
- Search and Rescue Team
- Floor plan of collapsed building



# ***Search and Rescue***

- Live camera showing Search & Rescue
- Rubble Camera showing condition of victim trapped in the collapsed building





# ***EMS - Transport***



- Victim transported to a local hospital – but requires extensive care during transport
- EMS requests video teleconference with ER Doctor

# ***EMS - Transport***

- Video conference between EMS in the ambulance and the ER Doctor at the local Hospital





# ***EMS – Hospital Live Teleconference***



# ***Scenario #2 – Suspicious Package***

- A suspicious package was reported

Disciplines involved:

- Bomb Squad
- Off-site Bomb Expert





# ***Suspicious Package: Live video from Bomb Robot***



# ***Live Video Telconference: IC, Bomb Squad & FBI Bomb Expert***





# ***Scenario #3 – Active Shooter***

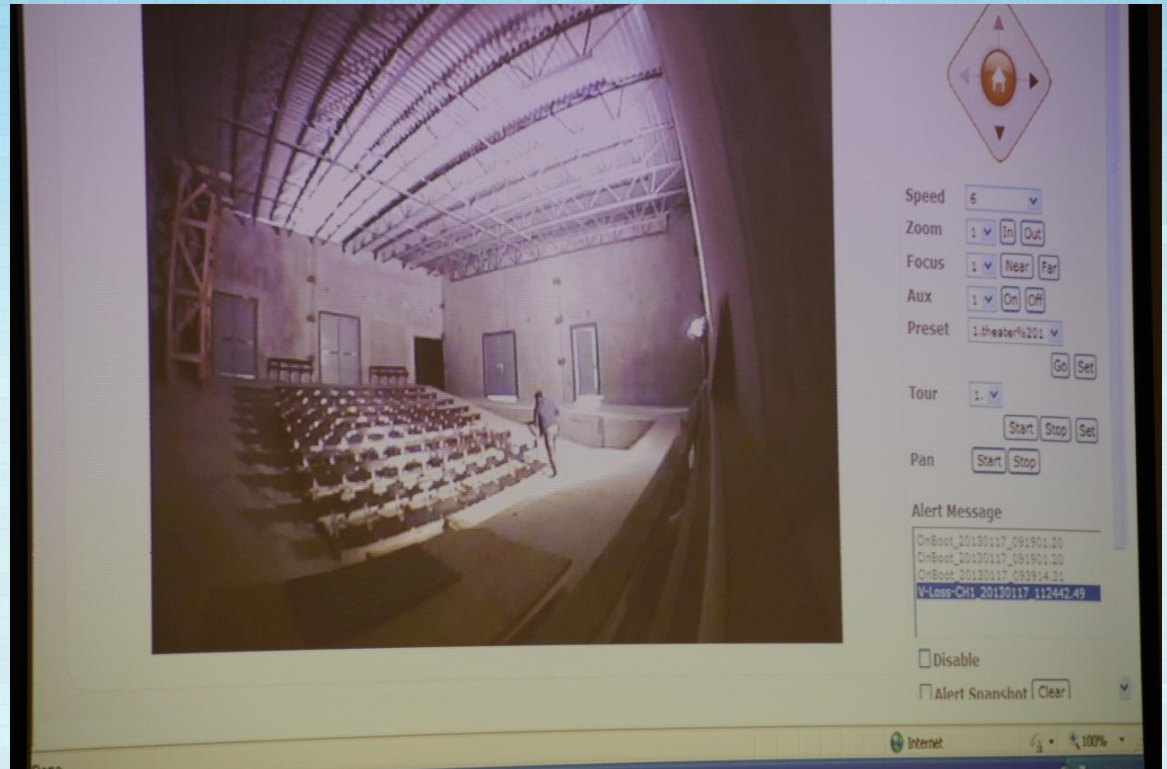
An active shooter was reported by a citizen inside a local theater

- Citizen was able to text a picture of the suspect to 9-1-1
- Video from inside the theater was accessed



# ***Active Shooter***

- A pre-arranged agreement between city and theater owner - allowed access to video from inside the theater





# ***Active Shooter***

- Live video outside the theater from a Law Enforcement vehicle



# ***Active Shooter***

- Live surveillance camera access of suspect being captured





# ***Summary of Lessons Learned***

- **“Real-life”** makes a **real** difference!
  - Board members are eager to hear what works and what doesn’t (Technical, financial & political)
  - Devices in the hands of board members brought reality to the project
  - Discussions with real users in Baytown were well-received and enlightening for all participants



# ***Summary of Lessons Learned***

- Scenarios gave tangible examples of use cases
  - Hey, this stuff really works!
- Learning how to use the data effectively may be as important as deciding how to deploy the network



# ***Broadband Interoperable Gateway Network (BIG-Net) Overview***

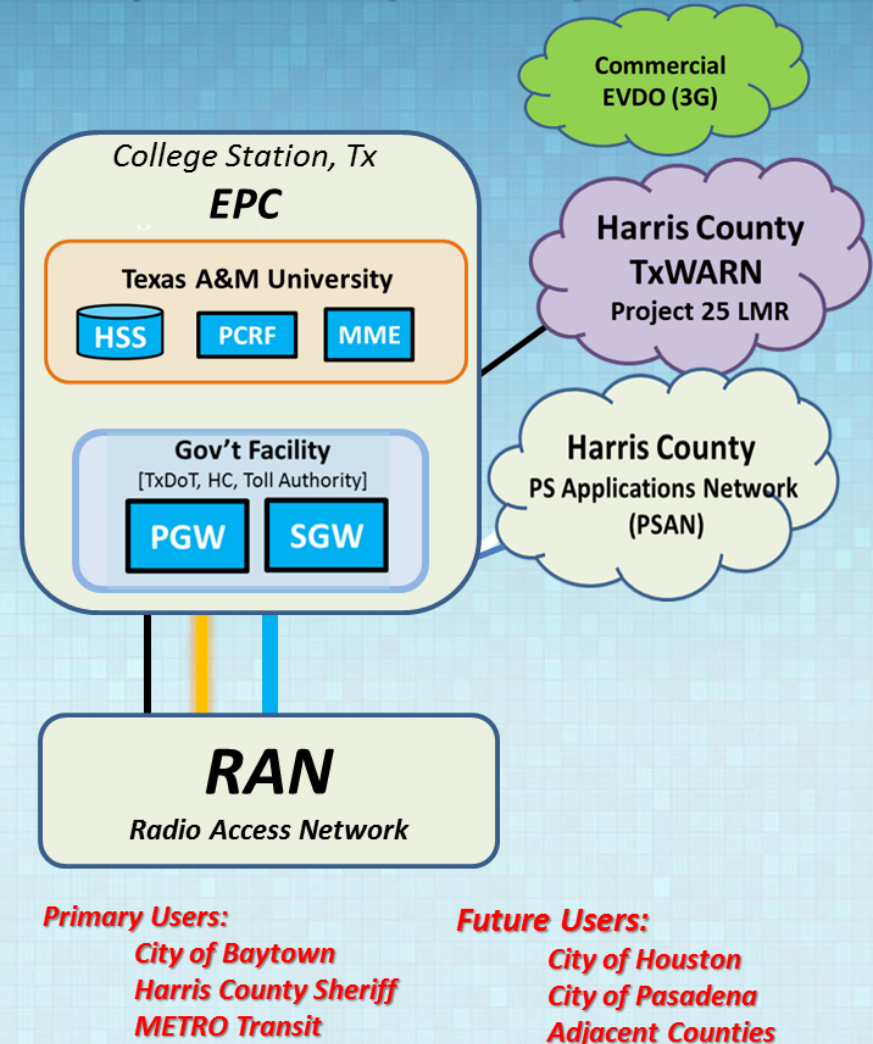


*Hurricane Ike Aftermath  
Texas 2008*

# Harris County BIG-Net Overview

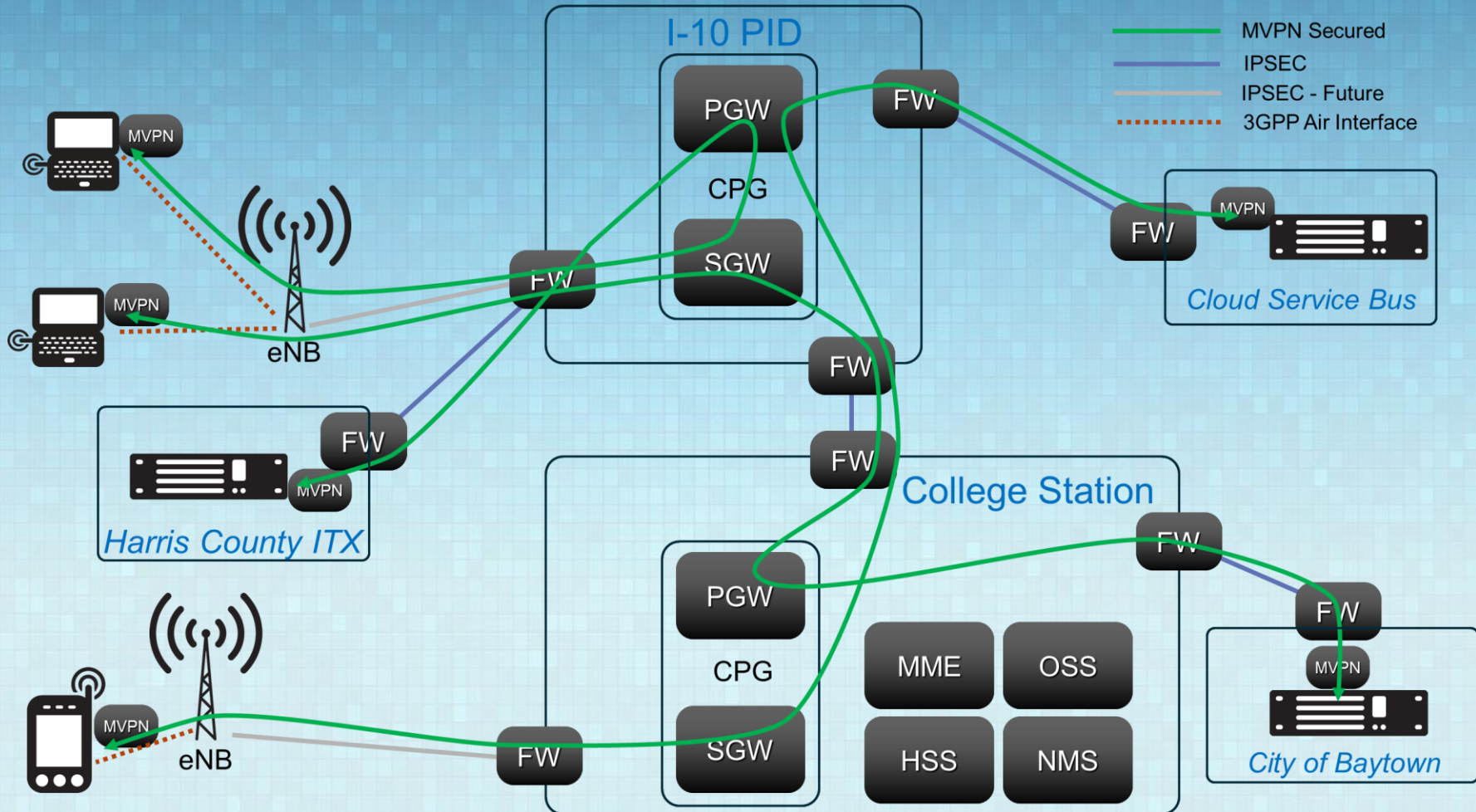
## Broadband Interoperability Gateway Network (BIG-Net)

- BIG-Net operates on PS PLMN ID 313-100
  - *First one issued!*
- BIG-NET Vehicular-based system using Vehicle Subscriber Modem (VSM)
- Distributed EPC components for operational efficiencies
- EPC connected to Harris County PSAN
- EPC connected TxWARN
  - P25 to LTE PTT service
- Not connected to commercial carrier at network layer
- Initial applications include:
  - video, PTT, database inquiries, and intranet access
- Approximately 40 Units in operational testing



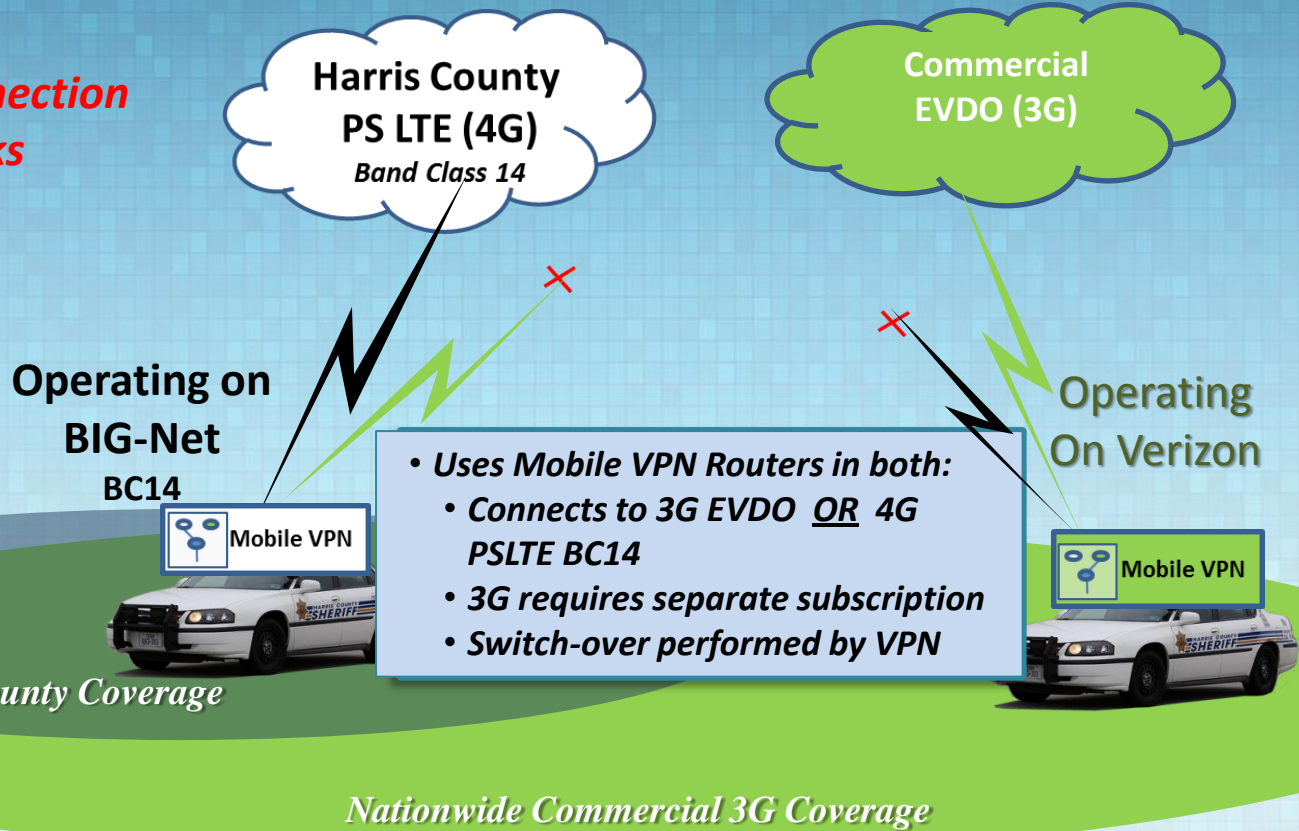


# Security Initiatives



# Multi-Network Operation

*Currently no connection  
between networks*



- Design allows coverage throughout region, but is not optimal
  - 3G not as robust, delivers fewer features and control mechanisms

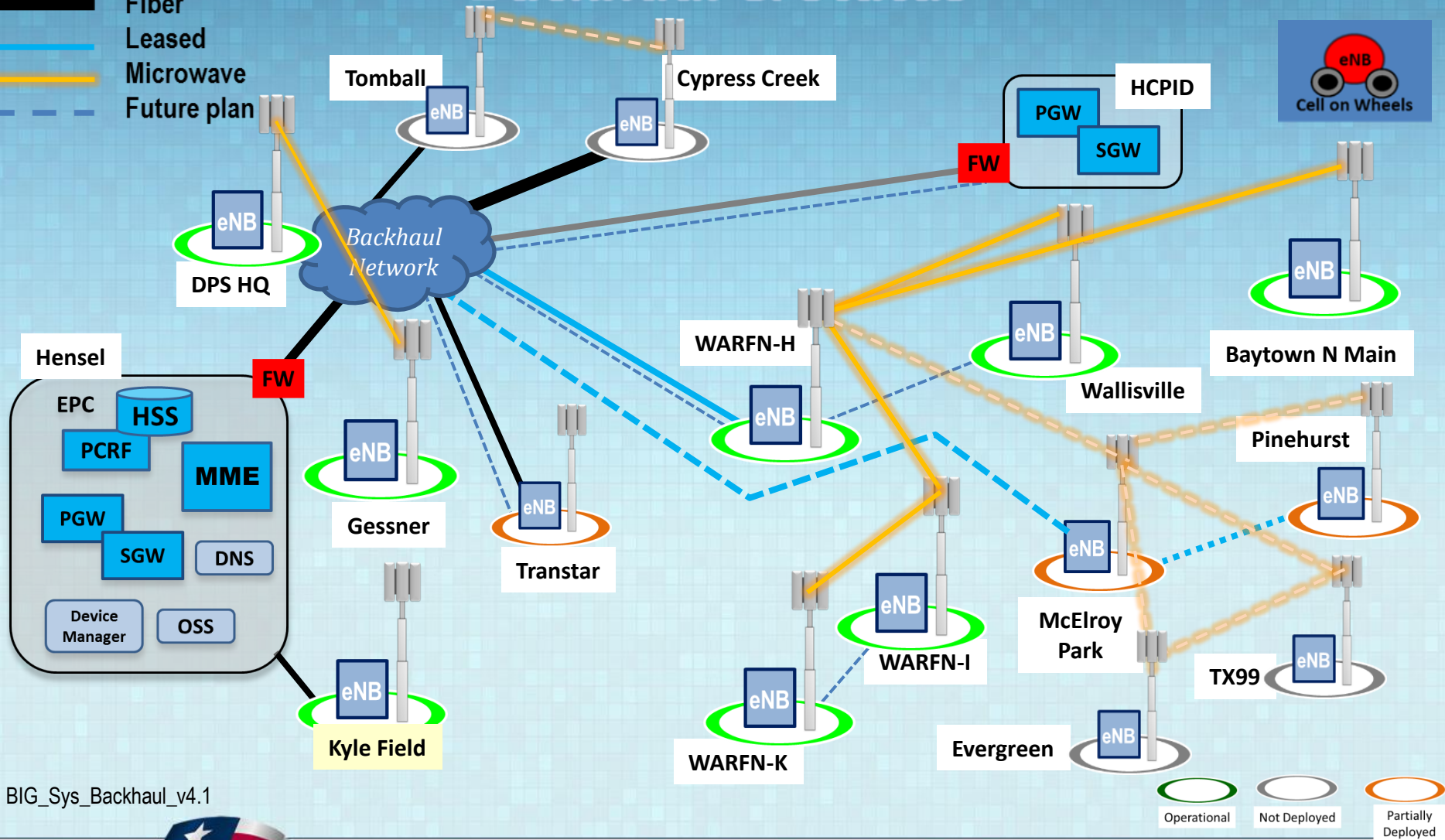




# BIG-Net System Diagram: Backhaul & Status

## BACKHAUL LINKS KEY

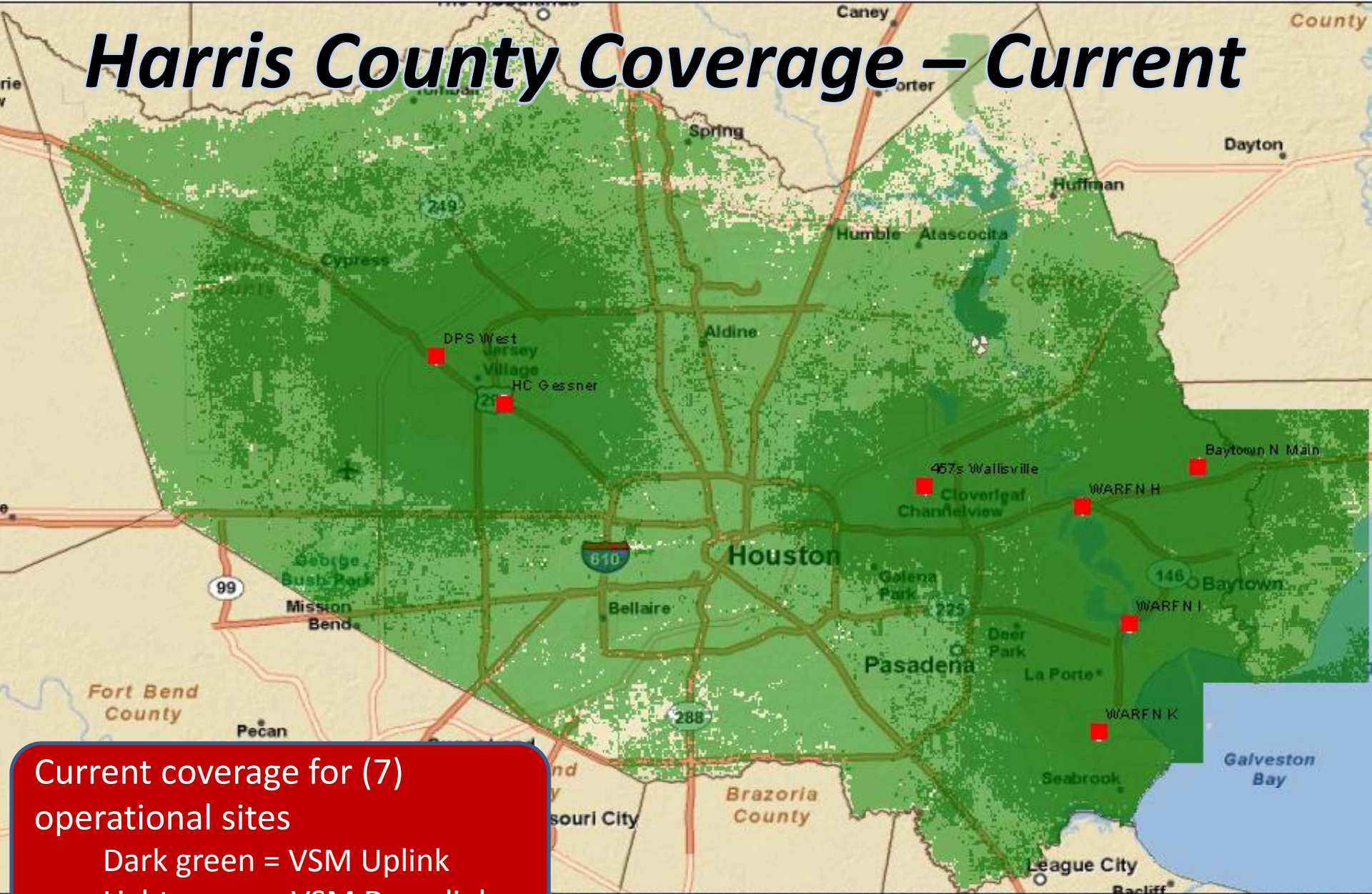
- Fiber
- Leased
- Microwave
- Future plan



BIG\_Sys\_Backhaul\_v4.1

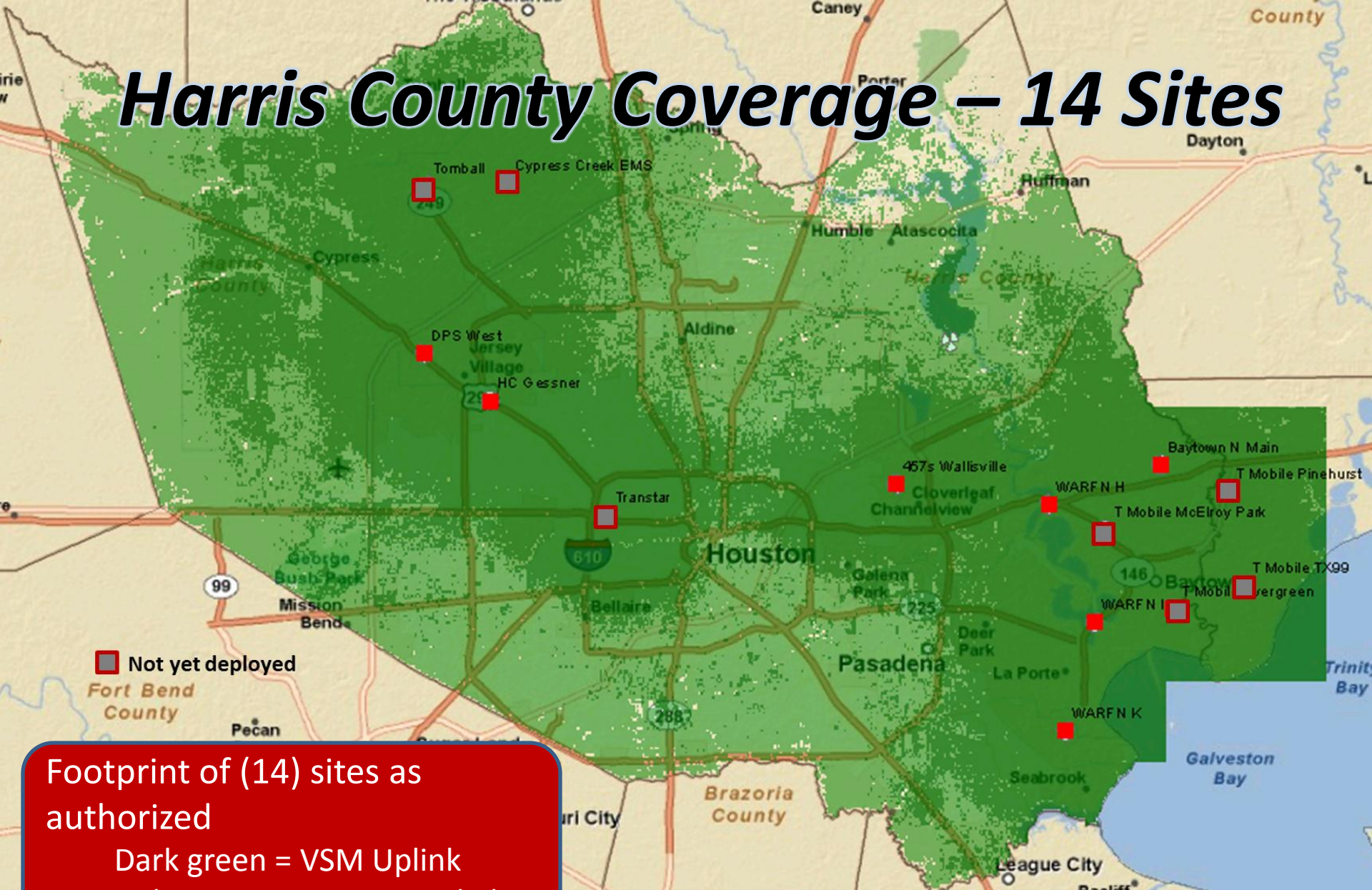


# Harris County Coverage – Current





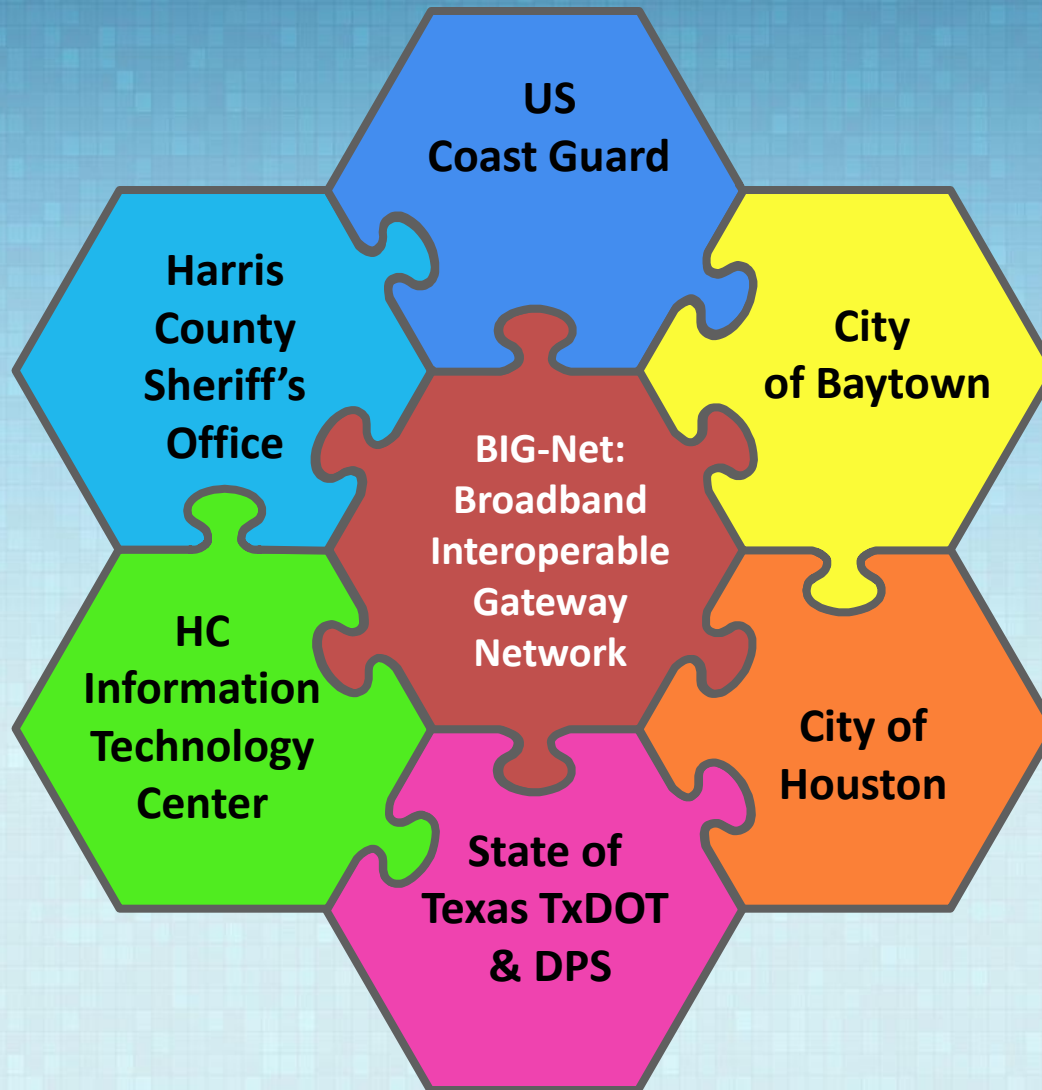
# Harris County Coverage – 14 Sites



Footprint of (14) sites as authorized

Dark green = VSM Uplink  
Light green = VSM Downlink

# ***Building a Solution***





# ***Infrastructure Sharing View***

- Remarkable diversity of tower owners (7) of current (14) sites
  - TxDOT, Harris County ITC , Texas DPS, City of Baytown, Transtar, Cypress Creek EMS and T-Mobile
- Core Equipment Facilities
  - Texas A&M, TxDOT/Harris Co.
- Backhaul
  - LEARN, TxDOT Fiber, Harris Co. Public Infrastructure Dept, HC Toll Road Authority

## ***Sharing Arrangements***

### **Commercial Site Sharing**

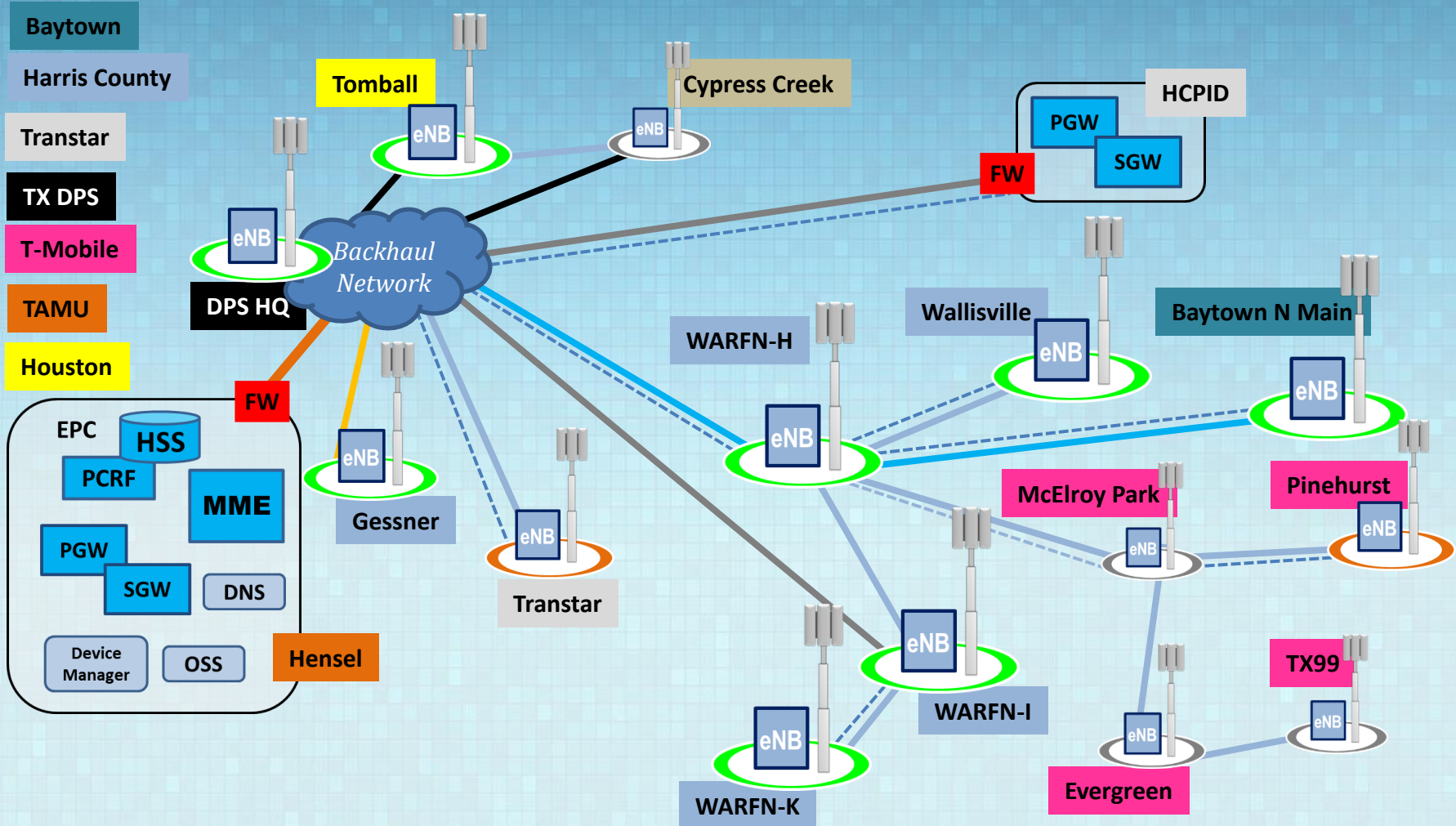
- Existing T-Mobile Agreement

### **User Site Sharing**

- Baytown – Reduced Fees

***Early partnerships with tower providers, carrier and local agencies enabled a viable business model.***

# BIG-Net Ownership View





# ***Example site detail: T-Mobile Pinehurst***



STATUS: eNodeB Up

160 Foot Self Supporting Tower, Built 2/2007

29 48 01.89 N 94 54 22.86 W

10155 ½ Pinehurst St.

Pasadena Fwy, Frontage Road, Pasadena, TX

Tower Owned by: T-Mobile West Corp

Land Owned by: City of Baytown

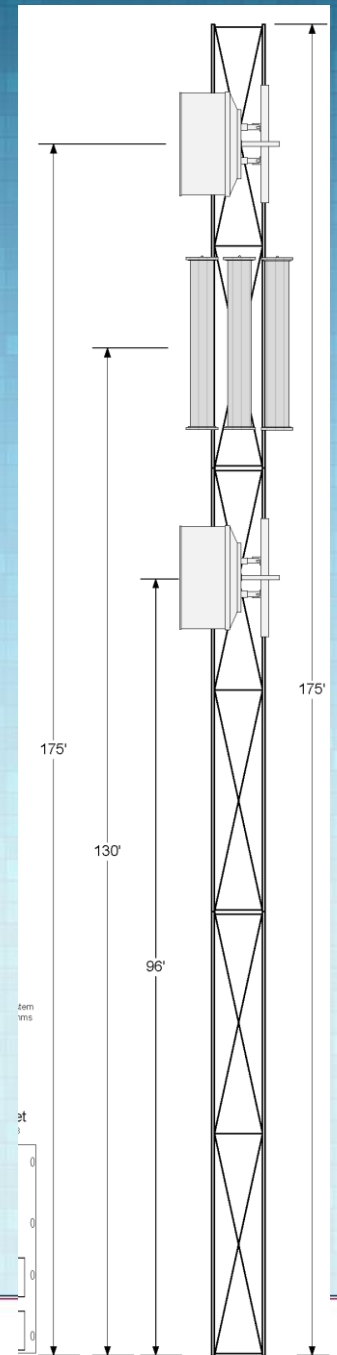
Backhaul Type: Fiber (under construction)

ASR: 1257073



## **SITE ACCESS INFO:**

Contact Dennis Wells  
((281) 683-1058) to  
obtain key.



# ***BIG-Net: Protecting City of Baytown***

- Home to largest oil refinery in US
- A total of 89 historical tornado events have been recorded since 1950
- Baytown uses 20 year old data system (RD-LAP), which can no longer be maintained.
  - Providing information to public safety, public service and public works
  - System degradation causes service issues daily
- BIG-Net deployment will dramatically improve the City of Baytown's ability to respond safely, quickly and efficiently.





A graphic of the Texas state flag, featuring a white star on a blue field and horizontal stripes of white, red, and blue, positioned behind the title text.

# ***Texas Public Safety Broadband Program***

**Thank You!**

**MIKE.BARNEY@DPS.TEXAS.GOV**